

## 1 Purpose and Need

As part of its mission to provide a safe, efficient, cost-effective transportation system, the Arizona Department of Transportation (ADOT) wishes to serve commuter and intercity travel needs and enhance travel opportunities within Maricopa, Pima, and Pinal counties. Statewide and regional transportation planning efforts undertaken from 2007 to 2010 (“Building a Quality Arizona,” or bqAZ) have recommended implementing passenger rail to add travel capacity to what highways already provide. For this reason, ADOT is studying passenger rail service options between the cities of Tucson and Phoenix to provide more travel choices in this 115-mile-long corridor. Passenger rail service would provide an alternative travel mode and would reduce travel times over highway travel. While the duration of a commercial flight between Tucson and Phoenix is approximately 45 minutes, once time to pass through airport security and to board passengers is added, passenger rail service between these cities could be faster than travel by air. By providing an alternative to private single-passenger vehicle travel within the study corridor, passenger rail would avoid traveler delays caused by highway congestion, enhance highway safety, and reduce pollutant emissions on Interstate 10 (I-10).

ADOT’s 2010 Statewide Rail Framework Study (ADOT 2010) and 2011 State Rail Plan (ADOT 2011) include a passenger rail vision for the state. The first step in the implementation of the plan would be to link Tucson and Phoenix, the state’s largest metropolitan areas. Both the State Rail Plan and the 2010 Statewide Rail Framework Study (ADOT 2010) showed that of all possible locations within Arizona, a passenger rail line between the Tucson and Phoenix metropolitan areas would serve the most people. Such a line could connect communities within the region and form the starting point for later rail connections to other regions.

The Federal Railroad Administration (FRA) is leading this Arizona Passenger Rail Corridor Study (APRCS): Tucson to Phoenix (also referred to as “the study” in this document). FRA provides financial and technical assistance for intercity passenger rail systems (focusing on regional trips). FTA, which is serving as a cooperating agency on the APRCS, provides financial and technical assistance to local public transit systems, including commuter rail. Because the APRCS addresses both intercity travel and commuter transit trips, both FRA and FTA have a role in project planning. The study examines and evaluates different route corridors between the Tucson and Phoenix areas.

As the federal lead agency, FRA is responsible for compliance with the National Environmental Policy Act of 1969 (NEPA) and determined that a Tier 1 Environmental Impact Statement was an appropriate document for examining the regional context of a future passenger rail system before focusing on the more detailed Tier 2 analysis that considers site-specific effects.

## 1.1 The Need for Passenger Rail Service

Between 1990 and 2010, the combined population of Maricopa, Pima, and Pinal counties increased by over 78 percent, according to the U.S. Census Bureau, from 2.9 million to nearly 5.2 million, with an over 61 percent increase between 1991 and 2010 in the number of nonfarm jobs. This three-county Study Area forms part of a clustered network of cities—a megaregion—known informally as the “Sun Corridor” (See **Figure 1-1**). Travel patterns, available transit services, and trip times indicate that the need to move people from one place to another is also growing. Based on population and travel forecasts, and the amount of available open land within the corridor, travel markets are expected to continue to grow in the future; however, opportunities to increase the carrying capacity of the region’s roadway network are limited.

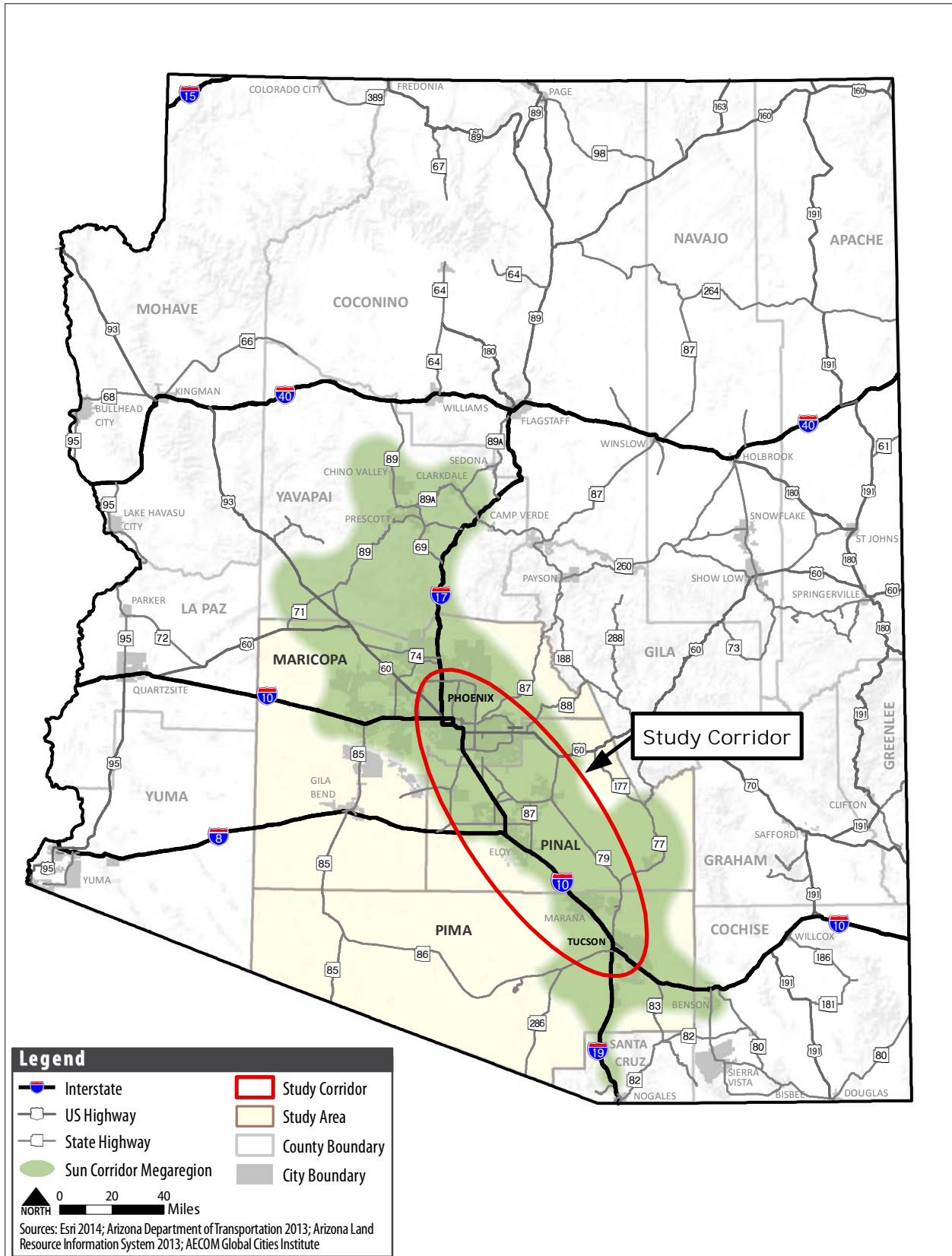
The Tucson and Phoenix metropolitan areas will continue to be major population and employment centers within the region. Most of Arizona’s developable land is situated between these cities, and development of this area is projected to form a continuous urban corridor connecting the metropolitan areas. As a result of recent and projected growth, the City of Casa Grande joined with the Pinal County communities of Eloy and Coolidge to form a new metropolitan planning organization (MPO), the Sun Corridor MPO, in 2013. With Arizona on a steady economic upswing after experiencing a downturn in the second half of the last decade, the increasing development in the corridor is projected to contribute to a need for increased commuter and intercity mobility within the corridor which will have to be addressed.

Travel between Tucson and Phoenix currently takes place almost entirely on I-10, the only high-capacity freeway between the two cities. Increasing congestion along this highway is lengthening travel times. Based on forecasts from studies conducted within this corridor, even a planned widening of the existing interstate to eight lanes and the construction of a planned new North-South Corridor will not provide adequate capacity to meet the expected demand in the year 2035 (ADOT 2007d, 2012).

As western Pinal County continues to develop, traffic congestion on area highways will cause an increase in travel times within the three-county Study Area. Considering the projected population growth and current travel patterns, **Table 1-1** illustrates trip lengths projected using the Arizona Travel Demand Model (version 2). These projected increases in travel time have the potential to discourage mobility of people and cargo, stifle productivity, and increase the cost of goods in the region.

Available transportation choices between Tucson and Phoenix are currently limited to private automobile, common carrier (bus), commercial flights, and ridesharing, with most travelers—commuter, regional, and intercity—using I-10. Despite recent widening of sections of the

Figure 1-1. State Map



interstate within the study corridor, motorists on I-10 experience severe congestion and traffic jams of increasing frequency and duration.

The growing demand placed on I-10 as the primary intercity route in the corridor—and the resulting congestion—will increase the likelihood of traffic collisions, which will further reduce the overall effectiveness and reliability of I-10 to serve commuter and intercity travel needs.

**Table 1-1. 2010, 2035, and 2050 Travel Time Comparison for Trips in Study Corridor**

Origin and destination (trip distance)	Congested travel time (minutes) <sup>a</sup>				Percent increase over 2010
	2010	2035 baseline	2050	Percent increase over 2010	
Apache Junction to Coolidge via US 60 (37 miles)	54	72	97	80%	
Eloy to Phoenix-Mesa Gateway Airport by way of I-10 (56 miles)	62	93	122	97%	
Phoenix to Marana (93 miles)	85	106	134	58%	
Marana to Tucson (25 miles)	33	43	51	55%	
Tucson to Phoenix by way of I-10 (116 miles)	113	142	180	59%	
<sup>a</sup> Estimated using Arizona Travel Demand Model, version.2 (AZTDM2).					

Increasing capacity by adding lanes to this highway cannot be accomplished in some sections, and adding lanes may not be the best solution to address the anticipated demand. An alternative transportation mode, such as passenger rail, could help meet the demand of existing and future travel markets by providing additional transportation capacity that would help serve the increasing travel demand and not be affected by unpredictable highway conditions.

### 1.1.1 Commuter Travel Need

Demand for commuter services, where most travelers make a same-day round trip during peak commuting periods, exists within the Tucson and Phoenix metro areas. Ridership on other fixed-route transit systems serving these cities has exceeded projected figures. Demand for this type of service is expected to grow in the future, as population growth in the service area is projected to remain high over the next few decades.

The average trip to work within the study area has grown longer as residential development has spread from the major cities to outlying areas and as population growth has increased traffic

congestion. As development in Pinal County proceeds, commuter activity will continue to expand in the areas between Tucson and Phoenix, with major daily commutes taking place between Pinal County and neighboring Maricopa and Pima counties. Emerging travel markets that would benefit from commuter service include:

- Tucson and suburban communities extending into Pinal County
- Phoenix and suburban communities extending into Pinal County
- Activity centers in Pinal County and the Tucson Metropolitan Area
- Activity centers in Pinal County and the Phoenix Metropolitan Area

US Census data indicate that Arizona's population grew by 81 percent between 1990 and 2010, from approximately 3.7 million to over 6.6 million. Projected population and job growth in the Sun Corridor are shown in **Table 1-2**. Only about 17 percent of the state's land is privately owned; because the majority of this private land is located within the Sun Corridor megaregion, population and employment growth are likewise focused in this region.

**Table 1-2. Projected Population and Employment Growth within the Sun Corridor**

	Maricopa County	Pima County	Pinal County
2010 Population	3,763,853	956,082	349,688
2035 Projected Population	5,684,351	1, 277,301	728,729
Percent Increase from 2010	51.0%	33.6%	108.4%
2010 Jobs	1,597,898	337,218	51,788
2035 Projected Jobs	2,636,798	472,599	244,096
Percent Increase from 2010	65.0%	40.1%	371.3%
Sources: US Census Bureau, Arizona Department of Administration, Office of Employment and Population Statistics 2014, US Bureau of Labor Statistics ( <b>Population</b> ); and Maricopa Association of Governments, Pima Association of Governments, and Central Arizona Governments geographic growth forecasts ( <b>Jobs</b> ).			

In Pinal County, high-density activity centers are expected to develop to serve the substantial infill of population and employment, in keeping with the region's long-range plans. Within the 2035 planning horizon, daily travel to these Pinal County activity centers from Maricopa and Pima counties will add to the region's total mobility needs. The overall increase in travel demand within the corridor will further tax a transportation system that already exceeds its capacity.

Recent regional travel conditions are represented by the following:

- A 2008 photo license plate survey of highway vehicles conducted by the Maricopa and Pima Associations of Governments (MAG and PAG, respectively), indicated that more than 51,000 daily trips were observed on I-10 and State Route (SR) 79, two primary north-south roads in the study area. Of these trips, 22 percent (11,220) completed a commute-type trip, where the vehicle traveling from one county to the next was observed returning at the same location.
- Data from the Census Transportation Planning Package (CTPP) from 2006-2010 indicate that daily inter-county commute trips within the three counties exceeded 80,000. Daily commute trips from Maricopa County to Pima County (i.e., Phoenix metropolitan area to Tucson metro area) averaged 2,565, and commute trips in the reverse direction numbered 2,375. The commute from Pinal County to Maricopa County represented about 72 percent of all the inter-county commute trips (57,600), with the second most frequent trip (11,570) being in the reverse direction, between Maricopa and Pinal counties, representing about 14 percent of all inter-county commute trips. By 2035, as Pinal County's employment is anticipated to more than double, the trips between Pinal and Maricopa counties could be expected to increase accordingly. About 2.6 percent of commuters in the United States are “super commuters,” travelling at least 50 miles one way (US Department of Transportation, Bureau of Transportation Statistics 2014). In Phoenix, the number of super commuters approaches 8.6 percent; and the most heavily traveled route in the United States among super commuters is the trip from Tucson to Phoenix (Nusca 2012). Meanwhile, Phoenix is the only metropolitan area in the United States with a population over 1 million without a commuter or regional passenger rail system.

### 1.1.2 Intercity Travel Need

Travel between Tucson and Phoenix for non-work purposes also accounts for many trips. As population and travel demand grow, intercity travel by auto and air will suffer from increasing congestion and time delays—especially in metropolitan areas, at and around airports, and on weekends and holidays. This decline in transportation service and the quality of the travel experience adversely affects intercity travelers, other users of the system, commercial carriers, and the general public.

As shown in **Table 1-1**, a statewide demand model indicates the duration of a trip from Phoenix to Tucson would increase by 59 percent by 2050, from under 2 hours to 3 hours, even if I-10 is widened to eight lanes between these cities and the proposed North-South Corridor multimodal facility between East Mesa and Eloy is constructed and opened.



Round-the-clock bus and flight schedules currently offered by private carriers between Tucson and Phoenix show that demand exists for a transportation solution other than the automobile that offers convenient, safe, and reliable intercity travel between these two metropolitan areas.

### 1.1.3 Need for Improved Connectivity within the Region and Beyond

Several modes of passenger service—both intercity and commuter—are currently available in the Tucson to Phoenix corridor, including conventional intercity rail (Amtrak, which provides limited service in the study area because access to stations is poor and travel schedules include infrequent departure and arrival times that often do not match peak schedule demand), common carrier (private bus), commercial airline, and ridesharing options. Public transit service such as bus and light rail is also available within urban communities. While each mode partially addresses some aspect of the region’s travel needs, most operate independently of one another. They could be considered emerging elements of a regional transit network but are missing the unified plan and strong backbone that tie a network together. A reliable Tucson-to-Phoenix rail connection could provide this backbone, close the gap that currently exists for potential commuters and intercity travelers, and create and deliver a robust customer base for a future network of commuter and intercity services.

Described below are the existing non-automobile travel choices within the study corridor, along with their passenger-carrying capacity, where available.

#### *Urban Public Transit Services*

The Phoenix (Maricopa County) and Tucson (Pima County) metropolitan areas are both served by local and regional fixed-route bus and commuter express bus service. Additionally, a light rail system in the Phoenix region connects the communities of Mesa, Phoenix, and Tempe. The line is 20 miles long, with a 3-mile eastward extension under construction and additional segments to the north and west in planning and design phases. In Tucson, service on a 4-mile modern streetcar line linking downtown Tucson with the University of Arizona campus was inaugurated in July 2014. Combined, the Tucson and Phoenix metro area fixed-route bus and rail services board over 69 million unlinked passenger trips annually, on a par with Minneapolis and Houston’s bus ridership, which rank the 15<sup>th</sup> and 16<sup>th</sup> highest in the nation, respectively (American Public Transportation Association 2013).

Commuter express bus service operates in the I-10 corridor in both the Tucson and Phoenix urban areas, with routes extending nearly to their respective borders with Pinal County. In the Phoenix region, a public park-and-ride facility located at 40<sup>th</sup> Street and Pecos Road is utilized by Pinal County residents, according to a 2005 passenger survey, to access the I-10 East RAPID, a heavily used commuter express bus route with over 166,000 annual riders into Phoenix.

Public transit service in Pinal County is limited but growing. The Cotton Express is a local circulator that operates four routes within Coolidge; and the Central Arizona Regional Transit (CART) travels between Florence, Coolidge, Central Arizona College, and Casa Grande. Currently, CART buses run every 90 minutes. A Tucson-to-Phoenix train with a station located along this 20-mile east-west CART route could extend passenger service beyond the localized connection. This could serve a substantial number of commuters from these established communities and the growing areas surrounding them and may increase ridership on CART.

### *Passenger Rail*

Amtrak's Sunset Limited line, which travels from New Orleans to Los Angeles, stops at two locations within the study area, Tucson and the City of Maricopa (in Pinal County). Trains run three times a week, stopping on Tuesday, Thursday, and Sunday evenings in the westbound direction and Monday, Thursday, and Saturday mornings in the eastbound direction. Although they connect parts of the study area by passenger rail, these Amtrak trains do not provide intercity service between Tucson and Phoenix. Currently no transit connection is available from the City of Maricopa to Phoenix.

### *Private Intercity Bus*

Greyhound Lines makes six intercity trips from Tucson to Phoenix each weekday with a 55-passenger bus. Bus service begins at the Greyhound terminal near Tucson's central business district and ends at the Greyhound terminal near Sky Harbor International Airport. Six trips are operated each weekday between Tucson and Phoenix as well. Some of these trips have intermediate stops in the City of Casa Grande (Pinal County).

Arizona Shuttle is a common carrier that makes 18 daily round-trips between Tucson and Phoenix Sky Harbor International Airport using 29-passenger buses. Three stops are in the Tucson area: Craycroft (east Tucson), University of Arizona Campus (central Tucson), and Ina Road at I-10 (north Tucson).

Based on the total number of trips and vehicle carrying capacity, the daily capacity of these scheduled services between Tucson and Phoenix is approximately 1,000 person-trips in each direction.

### *Commercial Aviation (Intercity Aviation)*

US Airways/American Airlines operates daily nonstop flights between Phoenix Sky Harbor International Airport (PHX) and Tucson International Airport (TIA). Between 7 and 10 weekday trips operate from PHX to TIA depending upon the day of the week, while 6 to 12 weekday trips are operated from TIA to PHX depending upon the day of the week. Most flights use a 90-passenger plane, while one trip each weekday uses a 140-passenger plane. Based on the



range of flights offered each weekday and the types of planes operated, the daily passenger capacity between PHX and TIA is 950, while the daily passenger capacity between TIA and PHX is 1,130, depending upon the day of the week. According to the US Bureau of Transportation Statistics (BTS 2014), the 2010 daily average number of passengers on these flights was 545 and 574, respectively.

### *Ridesharing*

Public and private ridesharing options within the study area include vanpooling and carpool ride-matching services. The largest public rideshare operator is Valley Metro in Phoenix, which coordinates vanpools originating in and destined to all three study area counties. In FY 2013, Valley Metro owned 412 vanpool vehicles having an annual ridership of 1,227,297 (Valley Metro 2013).

The preceding information demonstrates the need for both commuter and intercity transportation services to provide connectivity between local and regional routes within and throughout the study corridor. All three needs are addressed in the APRCS.

## **1.2 Purpose of a Passenger Rail System in Arizona**

The need for improved intercity and commuter services and regional connectivity throughout the entire Tucson-to-Phoenix corridor is the driving purpose behind the development of a high-capacity passenger rail system serving the communities between Tucson and Phoenix. The APRCS will help ensure coordination between agencies in defining the project, providing a corridor so that local and regional planning agencies can limit development to preserve rights-of-way, pursuing opportunities for funding, and ensuring plan compatibility with communities along the studied corridor alignment(s). The APRCS also strives to achieve efficiencies by undertaking a single analysis of alternatives and potential environmental consequences and by proposing a single infrastructure investment that would serve both travel markets.

The overall 115-mile corridor between Tucson and Phoenix is being studied to address intercity travel needs in an area where the demand for such travel is growing while opportunities for highway expansion are limited. An intercity connection could serve as a foundation for commuter service overlays in the urban areas, designed with the ability to grow along with commuter travel demand, reaching into and across Pinal County from both ends. Commuter services could span the entire corridor within the forecast timeframe of this study as Pinal County's employment base grows to rival Pima County's and establishes new patterns of daily trip interchanges from Pima and Maricopa counties to daytime destinations in Pinal County and back.

By evaluating both intercity and commuter travel needs simultaneously, the APRCS reports on all aspects of the alternative corridors and addresses the combined requirements of the Federal joint lead agencies. The purpose of proposed passenger rail service in Arizona is to provide high capacity intercity and commuter transit service in the identified study corridor that addresses the identified transportation problems within the larger framework of promoting regional connectivity throughout Arizona and the Southwestern United States. The purpose of proposed passenger rail service in Arizona includes:

- Providing transportation alternatives to the automobile within the Tucson-to-Phoenix travel corridor and reduce the growth in traffic congestion
- Increasing access to existing and planned employment and activity centers within the three-county study area
- Supporting reliable travel times and safe travel within an increasingly congested region that currently affords few transportation alternatives to the private automobile
- Facilitating continued development of a comprehensive, multimodal, and interconnected regional and multiregional transportation network that provides mobility choices for existing and future needs and allows connectivity to systems beyond the Tucson-to-Phoenix corridor

In satisfying these stated purposes, a transportation solution would also achieve the following beneficial outcomes:

- Support economic vitality by providing efficient, dependable, and convenient access to economic activity centers in the Sun Corridor
- Efficiently and predictably accommodate local, regional, commuter, and intercity movement of travelers throughout the corridor
- Enhance system linkages, multimodal connections, and accessibility to major population centers
- Support regional plans and policies that call for a balanced transportation system
- Incur potentially lower capital and operating costs than traditional highway facilities
- Avoid, reduce, minimize, or otherwise mitigate impacts on the environment

### 1.3 Program Area of Analysis

This Tier 1 Environmental Impact Statement (EIS) complies with NEPA, which requires that Federal agencies analyze a range of reasonable alternatives in an EIS (42 U.S.C. § 4332[c][iii]).

To meet this requirement, this Draft Tier 1 EIS evaluates potential environmental impacts of the alternatives broadly, over 1-mile-wide corridors, rather than along specific alignments within the three-county Study Area shown on **Figure 1-1**. The corridors provide a sufficiently flexible regional context for the best location of a passenger rail system while providing opportunities for alignment alternatives within the corridor to account for engineering and environmental constraints as well as public input when Tier 2 studies examine the corridor in greater detail. As described in **Chapter 5, Existing Conditions and Environmental Consequences**, a future alignment is likely to affect a corridor of 200 feet or less, so the impact analysis also includes a discussion of the representative effects for the narrower corridor.

If a corridor alternative is selected in Tier 1 rather than the No Build Alternative, additional public input and more refined engineering studies would be undertaken as part of a Tier 2 NEPA review. The Tier 2 NEPA review would identify and analyze the potential impacts of alignment alternatives within the corridor selected at Tier 1.

### 1.4 Connected Actions

#### 1.4.1 Station Locations

This Draft Tier 1 EIS does not identify specific station locations for analysis. An Alternatives Analysis (AA) undertaken as part of the APRCS included conceptual station locations to provide a basis for corridor definition and ridership forecasting. As part of the AA, various types of stations were developed to provide context for station decision-making and local commitments. However, the exact locations of stations will require more analysis and further agency and community input. These will be part of independent localized studies and a Tier 2 NEPA document for a passenger rail facility if a corridor alternative is selected.

#### 1.4.2 Airport Connections

During the AA and the Draft Tier 1 EIS corridor analyses, the public identified airport access as an important consideration among their preferences as a feature of future passenger rail service. All three major airports in the study corridor – Tucson International Airport (TIA), Phoenix-Mesa Gateway Airport (AZA), and Sky Harbor International Airport (PHX) – could potentially have connections to a future passenger rail line, but a detailed evaluation of specific alignments, impacts, or other implications of how these connections would be accomplished was not a part of this study. These analyses would be undertaken as part of future studies if a corridor alternative is selected.

### 1.4.3 Southwest Regional Context

Each alternative rail corridor was assumed to connect in the future to a larger regional western states rail network connecting California, Arizona, and Nevada, including the California High-Speed Rail System. As identified as part of the *Southwest Multi-State Rail Planning Study* (FRA 2014), the western network is envisioned to include a high-speed rail connection between Phoenix, Las Vegas, and Los Angeles. High-level design and system performance assumptions were made to be compatible with the potential future regional network shown in **Figure 1-2**.

**Figure 1-2. Future Western Regional Rail Network**



Source: *Southwest Multi-State Rail Planning Study* (FRA 2014)